As shown in FIG. **9**, blades **12** of a boomerang of the present invention have their initial curve radius r_0. In order for a boomerang of the present invention to have its flying time long enough to fly back to its launching position, the initial curve radius r_0 must have a value of ≥1/5 of the radius R of the ring **13**. In addition, blades **12** also must have the ratio between the total area of the blades and the area of a circle defined by the ring **13** of from about 12% to about 40%, preferably of from about 12.5% to about 38%.

In use, the boomerang **1** is placed onto the upper part of the hand-held launcher **2** in such way that the end of shaft **23** and means **231**, which shall rotate synchronistically with the shaft **23** when the shaft **23** rotates, on the upper part of said hand-launcher **2** are properly fitted into respective sockets **111** given in the bottom side of said boomerang **1**. The user firmly holds body **21** by one hand, then uses his other hand to gasp and pull unit **22** of a pull-cord rotary movement transferer placed inside the holder **21**. As a result, the shaft **23** rotates and transfers a rotary movement to the boomerang **1**.

As the blade speed of the boomerang **1** increases, the force F (as sum of lift force F_l and drag force F_d), M, and β increases, while α decreases. At the same time when M increases, the curve radius r of the blades increases (i.e. the flexure of the blades simultaneously decreases) as shown in FIG. **9**. An increase of α and a decrease of r results in a decrease of F and M.

During the flying time, due to the effect of the drag force, some of the kinetic energy will be transferred into heat, causing blade speed to decrease. As a result, F, M, and β decreases, while α increases. The increase in α leads to an increase in F and M.

The above adjusting process occurs automatically so that β is always the root of the equation $M=M_e=k\cdot\beta$ throughout the flying time. As a result, the boomerang of the present invention has a longer flying time and an amusement effect that is more fascinating compared with other existing flying toys having fixed elevation angle.

While certain preferred embodiment of the present invention has been disclosed above in detail, it is to be understood by persons skilled in the art that various modifications other than the above disclosed embodiment may be adopted without departing from the spirit or the scope of the invention.

I claim:

1. A boomerang comprising:

a center part comprising at least one opening for attaching to a launcher,

a plurality of blades extending radially from the center part, the inner ends of the blades coupled to the center part, wherein the blades are evenly distributed about the center part and wherein the blades comprise a front edge and a rear edge, the front edge describing a leading portion of the blades when the boomerang is in a rotational motion and the rear edge describing a trailing portion of the blades when the boomerang is in the rotational motion; and

a ring, wherein the inner perimeter of the ring is mounted on the outer ends of the blades;

wherein the inner ends of the blades comprise a first groove on the rear edge of the blades and the outer ends of the blades comprise a second groove on the rear edge of the blades, the first groove spaced apart from the second groove along the rear edge of the blades, the first groove and the second groove each join the rear edge through curved zones of transition;

wherein the inner ends of the blades comprise a third groove on the front edge of the blades and the outer ends of the blades comprise a fourth groove on the front edge of the blades, the third groove spaced apart from the fourth groove along the front edge of the blades, the third groove and fourth groove each join the front edge at an intersection point;

wherein the ratio between a distance between the first groove and the third groove, and a width of the blade is from about 1/7 to 6/7;

wherein the ratio between the total area of the blades and the area of a circle defined by the ring is from about 12.5% to about 38%; and

wherein each blade of the plurality of blades has a curved profile, wherein the curved profile includes a curve radius r_0, wherein the curve radius r_0 is a first value when the boomerang is stationary and a second value when the boomerang is rotating, the first value is greater than the second value.

2. The boomerang of claim **1**, wherein the blades comprise a plastic film.

3. The boomerang of claim **2**, wherein the plastic film has a specific weight from about 0.9 g/cm^3 to about 1.60 g/cm^3.

4. The boomerang of claim **1**, wherein the blades comprise a plastic film selected from the group consisting of polyvinyl chloride, polypropylene, polyethylene terephthalate, polystyrene, and high impact polystyrene.

5. The boomerang of claim **1**, wherein the blade has a thickness from about 0.1 mm to about 1 mm.

6. The boomerang of claim **1**, wherein the first value of the curve radius r_0 of the blades is at least 1/5 of the radius of the ring.

7. The boomerang of claim **1**, wherein the ratio between a total area of the blades and the area of a circle defined by the ring is from about 12% to about 40%.

8. The boomerang of claim **1**, wherein the blades have an elevation angle α_0 from about 10° to about 45°.

9. The boomerang of claim **1**, wherein the blades comprise a polymer selected from the group consisting of polyvinyl chloride, polypropylene, polyethylene terephthalate, polystyrene and high impact polystyrene; wherein the specific weight of the polymer is from about 0.9 to about 1.60 g/cm^3; wherein the thicknesses of the blades is from about 0.1 mm to about 1 mm; wherein the ratio between a distance between the second groove and the fourth groove, and a width of the blade is from about 1/7 to about 6/7; and wherein the blades have an elevation angle α_0 from about 10° to about 45°; wherein the curve radius r_0 of the blades is at least 1/5 of the radius of the ring.

10. The boomerang of claim **1** comprising two blades.

11. The boomerang of claim **1** comprising three blades.

12. The boomerang of claim **1** comprising more than three blades.

13. The boomerang of claim **1**, wherein a top side of the center part has a round pyramid shape.

14. The boomerang of claim **1**, wherein the ring comprises transparent or semi-transparent plastic.

15. The boomerang of claim **1**, wherein the ring is hollow.

16. The boomerang of claim **1**, comprising a light system, wherein the light system comprises LEDs and an electrical source having a switch that is turned on/off by centrifugal force.

17. The boomerang of claim **1**, wherein an initial curve radius of the blades is at least 1/5 of the radius of the ring, the initial curve radius describing an extent of upward deflection of the blades when the boomerang is motionless, wherein the ratio between the depth of the rear groove and the width of the blade is from about 1/7 to about 6/7, and wherein the total area of the blades is from about 10% to about 40% of the area of a circle defined by the ring.